

1. Suppose that you are going to sell tickets to a charity flag-football game. You believe that the number of tickets that you sell will be affected by the price of the tickets, and you have come up with equation to model this:

$$S = 3200 - 150x$$

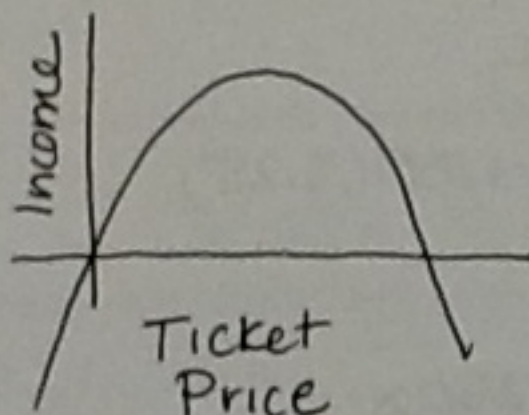
S = number of tickets sold

x = price of tickets (in \$)

- a. Write an equation that will give you the income, I , as a function of ticket price x . Make sure to write it in simplest form.

$$I = 3200x - 150x^2$$

- b. Graph your equation on your calculator and then sketch it below. Label your axes (which is ticket price and which is income?)



- c. How much should you charge per ticket to make the maximum income? And what would be the maximum income?

~~10.67~~ ticket price $\approx \$10.67$

max. income $\approx \$17,066.67$

- d. If you know that your expenses will be \$4500, write an equation that will give you the profit, P , as a function of ticket price, x

$$P = -4500 + 3200x - 150x^2 \text{ (ascending)}$$

$$P = -150x^2 + 3200x - 4500 \text{ (descending)}$$

- e. What is the maximum profit that you can make? What ticket price will give you this maximum profit?

max. profit $\approx \$12,566.67$

ticket price $\approx \$10.67$

- f. What is the ticket price that will have you break even for the event? Write the equation that will help you solve this and then solve it.

$$0 = -4500 + 3200x - 150x^2$$

ticket price $\approx \$1.51$ or ~~ticket price~~ $\approx \$19.82$

- g. If you need to make a profit of \$1800, how much should you charge per ticket? Write an equation to represent this and solve it.

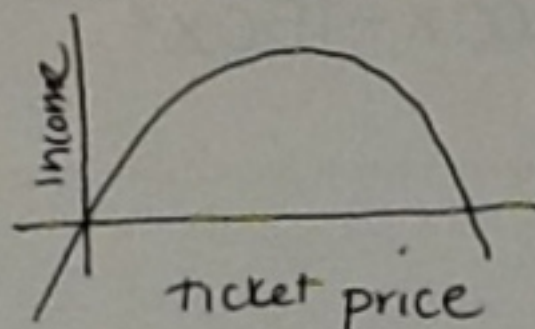
$$1800 = -4500 + 3200x - 150x^2$$

$$x \approx \$2.19 \text{ and } x \approx \$19.14$$

2. The planning committee for the annual school musical at Shrewsbury High believes that the income for the play will be related to the ticket price by the equation:

$$I = -65x^2 + 1250x \quad \text{where } I = \text{income and } x = \text{ticket price}$$

- a. Graph the income equation and then draw it below. Label your axes.



- b. How much income would be expected if the play costs \$8.25 per ticket?

$$I = -65(8.25)^2 + 1250(8.25) \\ = \$5888.44$$

- c. What ticket price(s) will give you an income of \$900? Write the equation that would represent this situation and then the solution(s).

$$900 = -65x^2 + 1250x \\ x \approx \$0.75 \text{ and } x \approx \$18.48$$

- d. How much would you charge for a ticket if you were on the committee? Why?

~~$P = -65x^2 + 1250x - 2450$~~
I would charge \$9.62 per ticket because this would give me a maximum income of \$609.62

- e. Suppose the expenses for the play are about \$2450. Write an equation that would give you the profit, P.

$$P = -65x^2 + 1250x - 2450$$

- f. What is the maximum profit that the committee could expect to make? What ticket price would give you that maximum profit?

$$\text{max profit} \approx \$3559.62 \\ x \approx \$9.62$$

- g. What is the break-even ticket price? Write an equation that would represent this situation and then solve it.

$$0 = -65x^2 + 1250x - 2450 \\ x \approx \$2.22 \text{ and } x \approx \$17.02$$